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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,199	04/09/2004	Kenichiro Nagasaka	450100-05018	2299

7590 09/07/2007

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EXAMINER	
JEN, MINGJEN	

ART UNIT	PAPER NUMBER
3609	

MAIL DATE	DELIVERY MODE
09/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/822,199	NAGASAKA, KENICHIRO	
	Examiner	**Art Unit**	
	Ian Jen	3609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04/09/2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/09/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1,2, 4-9, 11, 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Seraji et al (US Pat 6505096).

As for claim 1, Seraji et al shows a movement control system for a robot having a base and a plurality of movable regions connected to the base (Fig 1; Col 3, lines 55- Col 4, lines 20), the system comprising: fundamental constraint-condition setters for setting movement constraint-conditions, which are imposed in accordance with a task and a movement state applied to the robot, for each kind of constraint (Fig 3, Col 4, lines 29-32; Col 6, lines 53 - Col 7, lines 14 where fundamental constraint condition setter is desired pattern generator; Col 18, lines 11-30; Col 45- 67); a constraint-condition setting unit for imposing the movement constraint conditions of the entire robot necessary for a state variation of the robot by selectively using the appropriate fundamental constraint-condition setter in accordance with a movement-constraint requirement produced during execution of a task and a movement of the robot (Col 12, lines 5-56); and a drive-amount determining unit for determining a drive amount of each of the movable regions so as to satisfy the entire movement-constraint conditions set by the constraint-condition setting unit (Col 6, lines 42- 57).

As for claim 2, Seraji et al shows a system wherein the plurality of movable regions comprise at least an upper limb, a lower limb, and a body section (Fig 1, See Wrist Roll 5, Elbow Roll 3 and Should Roll 5; Col 6, lines 25-28).

As for claim 4, Seraji shows a system wherein each of the fundamental constraint-condition setters for each kind of constraint expresses movement constraint conditions imposed in accordance with a task and a movement state of the robot as a linear equality of a variation of a state variable (Col 12, lines 10-50; Col 13, lines 5 -35).

As for claim 5, Seraji shows a system wherein each of the fundamental constraint-condition setters expresses a constraint equation by a Jacobian form (Abstract; Col 15, lines 8-21).

As for claim 6, Seraji shows a system wherein each of the fundamental constraint-condition setters expresses a movement constraint condition imposed in accordance with a task and a movement state of the robot as a linear inequality equation of a variation of a state variable (Col 11, lines 14 -30; Col 15, lines 8-21).

As for claim 7, Seraji shows fundamental redundancy drive-method setters for setting redundancy drive-methods, which are changed in accordance with a task and a movement state applied to the robot, for each kind of norm (Fig 1; Col 7, lines 8 - Col 8, lines 30; Col 9, lines 24- 36); a redundancy drive-method setting unit for setting redundancy drive-methods of the

entire robot by selectively using the appropriate fundamental redundancy drive-method setter in accordance with a requirement for changes generated during execution of a task and a movement of the robot (Fig 1; Col 2, lines 63 - Col 3, liens 14; Col 9, lines 28- 39 where redundant manipulator as redundancy drive-method setting unit); and a drive-amount determining unit for determining a drive amount of each of the movable regions so as to satisfy the redundancy drive-method set by the redundancy drive-method setting unit (Fig 1; Col 7, lines 8 - Col 8, lines 30; Col 9, lines 24- 36; Col 12, lines 53- Col 13, liens 5).

As for claim 8, Seraji shows equality-constraint condition setters for expressing movement constraint-conditions, which are imposed in accordance with a task and a movement state applied to the robot, for each kind of constraint by a linear equality equation of a variation of a state variable (Col 12, lines 10-50; Col 13, lines 5 -35); an equality-constraint condition setting unit for imposing movement-constraint conditions of the entire robot necessary for a state variation of the robot by selectively using the appropriate equality-constraint condition setter in accordance with a requirement for a movement constraint generated during execution of a task and a movement of the robot (Col 12, lines 10-50; Col 13, lines 5 -35); inequality-constraint condition setters for expressing movement constraint-conditions, which are imposed in accordance with a task and a movement state applied to the robot, for each kind of constraint by a linear inequality equation of a variation of a state variable (Col 11, lines 14 -30; Col 15, lines 8-21); an inequality-constraint condition setting unit for imposing movement-constraint conditions of the entire robot necessary for a state variation of the robot by selectively using the appropriate inequality-constraint condition setter in accordance with a requirement for a

movement constraint generated during execution of a task and a movement of the robot (Col 11, lines 14 -30; Col 15, lines 8-21); fundamental redundancy drive-method setters for setting redundancy drive-methods, which are changed in accordance with a task and a movement state applied to the robot, for each kind of norm (Fig 1; Col 7, lines 8 - Col 8, lines 30; Col 9, lines 24- 36); a redundancy drive-method setting unit for setting redundancy drive-methods of the entire robot by selectively using the appropriate fundamental redundancy drive-method setter in accordance with a requirement for changes generated during execution of a task and a movement of the robot (Fig 1; Col 2, lines 63 - Col 3, liens 14; Col 9, lines 28- 39 where redundant manipulator as redundancy drive-method setting unit);

and a drive-amount determining unit for determining a drive amount of each of the movable regions so as to entirely satisfy equality and inequality-constraint conditions of the entire robot set by the equality-constraint condition setting unit and the inequality-constraint condition setting unit, and to entirely satisfy redundancy drive-methods of the entire robot set by the redundancy drive-method setting unit (Fig 1; Col 7, lines 8 - Col 8, lines 30; Col 9, lines 24-36; Col 12, lines 53- Col 13, liens 5).

As for claim 9, Seraji shows a system wherein the polarity of movable regions comprise at least an upper limb, a lower limb, and a body section. (Fig 1, See Wrist Roll 5, Elbow Roll 3 and Should Roll 5; Col 6, lines 25-28).

As for claim 11, Seraji shows a system wherein each of the equality-constraint condition setters expresses a constraint equation by a Jacobian form (Abstract; Col 15, lines 8-21).

As for claim 12, Seraji shows a system wherein the drive amount determining means comprises: a quadratic programming-problem solver for solving a vacation of a state variable of the robot by formulating equality and inequality constraint condition of robot and redundancy drive method for the robot as quadratic programming problems(Col 16, lines 18-55; Col 16, lines 56- Col 17 lines 9); an integrator for calculating a state of robot at a succeeding time by integrating variation of state variable(Fig 10, Col 6, lines 52-54; Col 13, lines 10-27).

3. Claims 3, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seraji (US Pat 5430643) in view of Watanabe et al (US Pat 5740329). Seraji disclose all elements per claimed invention as explained in paragraph 2 above. However, it is silent as to the specifies of the posture angle of the robot is expressed using virtual joint of a virtual link.

As for claim 3, Watanabe et al (US Pat No 6853881) shows a system wherein a posture angle of the entire robot is expressed AND TESTED using a virtual joint angle of a virtual link (Abstract, Col 1, lines 63 - Col 2, lines 8; Col 4, lines 62 - Col 5, lines 6 where the robot is simulated as the virtual joint angle of a virtual link).

It would have been obvious for one of ordinary skill in the art to provide virtual robot testing simulation to Seraji et al, as taught by Watanabe et al, for the purpose of providing computerized testing means prior to actual implementation of the robotic system

As for claim 10, Watanabe et al shows a system wherein a posture angle of the legged walking robot is expressed using a virtual joint angle of a virtual link.

It would have been obvious for one of ordinary skill in the art to provide an angle expression method as the simulation and design to Takenaka et al, as taught by Watanabe et al, for the purpose of providing angel expression means in the virtual link of dynamic robotic system in computer simulation prior to physical robot creation.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hirai et al (US Pat 7096983) shows a biped robot.

Bottero et al(US Pat 6711468) shows a robot control unit.

Hattori et al (US Pat 6463356) shows robot control device.

Takenaka et al (US Pat 6064167) shows robot control device.

Takenaka et al (US Pat 6876903) shows robot control device.

Takenaka et al (US Pat 6505096) shows robot control device.

Takenaka et al (US Pat Pub 2003/0125836) shows robot control device.

Takahashi et al (US Pat 5349277) shows robot control device.

Lee et al (US Pat 5740329) shows robot control device.

Seraji et al (US Pat 5294873) shows robot control device.

Kaneko et al (US Pat 5724239) shows robot control device.

Kukori et al (US Pat Pub 2002/0183897) shows robot control device.

Hansen et al (US Pat 5394322) shows robot control device.

Furuta et al (US Pat 6943520) shows robot control device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian Jen whose telephone number is 571-270-3274. The examiner can normally be reached on Monday - Friday 8:00-5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi Tran can be reached on 571-272-6916. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ian Jen

Aug 30,2007

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